ETMS Software Requirements

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Revision History

Revision	Date	Authors Initials	Description of the Change
Version 1.2	June 25, 1999	MT	Initial Version
Version 1.3	April 10, 2002	MT	Updated for FCA Flights
Version 1.4	May 15, 2002	MT	Modified to reflect changed requirements for draw route and beacon code in Customize Flights

1.0   INTRODUCTION

The purpose of this document is to define the rules for controlling the display attributes of flights. The display attributes that are under the control of the user consist of the following:

    Show/Hide Data Block
    Include Org/Dest, Route, or neither in the data block
    Include Beacon Code in the data block
    Color of the icon
    Type of icon (dot, airplane, automatic)
    Last TZ
    History
    Lead Line
    Delete Flight Icon
    Draw Route
    Location of the Data Block relative to the flight icon

The TSD has six functions that control which flights are displayed. These functions are:

    Select Flights
    Find Flights
    Customize Flights and the associated quick keys
    Browse function pop-up menu
    Examined Flights
    FCA Flights

Each of these functions defines the settings for some or all of these attributes. As a result, the user has multiple ways to change the display attributes of flights. This is both good and bad. The good part is that the user has a great deal of flexibility in setting the display attributes. The bad part is that this flexibility leads to confusion not only with the user but there is also confusion as to how these functions should interact from an implementation point of view. This document attempts to define the rules regarding the setting of display attributes within each function and the interrelationship between functions.

2.0   SELECT FLIGHTS FUNCTION

The Select Flights function is the primary means of defining which flights will be shown on the TSD display. This function controls the following display attributes:

> Show/Hide Data Blocks
> Include Org/Dest, Route, or neither in the data block
> Draw route
> Type of icon (dot, airplane, or automatic)
> Color of the icon

The TSD shall implement the following rules for controlling these display attributes:

1. The Select Flights function shall define the default state for the data blocks for all flights in the flight set. This definition of this default state shall include whether or not the data block is to be drawn and whether it is to include ORG/DEST or ROUTE. The Select Flights function also defines the default icon that shall be used to display the flight.

2. When OK or APPLY is clicked in Select Flights and the data block option is checked (to be shown) for the flight set, then the TSD shall show data blocks for all flights in the flight set even if other functions (including Browse) have previously toggled data blocks off.

3. When OK or APPLY is clicked in Select Flights and the data block option is unchecked (hidden) for the flight set, then the TSD shall hide data blocks for all flights in the flight set even if the Browse function has previously toggled the data block on for selected flights. However if the data block option is selected in Customize Flights, then that option shall override the Select Flights option and data blocks shall be shown. Also if the flight is a "found flight" then the data block shall be shown.

3.0   FIND FLIGHTS FUNCTION

The Find Flights function can added flights to the display which are not also included in one of the flight sets being shown as a result of other functions. The Find Flights function controls the following display attributes:

> Icon color
> Type of icon
> Show/Hide Data Block

The TSD shall implement the following rules for controlling these display attributes with the Find Flights function:

1. When OK or APPLY is clicked in the Find Flights dialog box, all flights that are included in the List of Found Flights shall be drawn with their data blocks. In the case when a flight becomes active at a later time, the TSD shall draw the flight with its data block when it becomes active. (Even if the data block for a particular flight has been toggled off using the browse function, it will be turned back on when OK or APPLY is clicked in Find Flights.)

2. When OK or APPLY is clicked in the Find Flights dialog box, the TSD shall restore all deleted flight icons that are found flights.

3. The TSD shall draw "found" flights using the automatic icon.

4. If a "found" flight is <u>not</u> a member of a "shown" flight set (as defined in Select Flights) or if flights are OFF (not shown), the TSD shall draw the flight with the following attributes:

    a. The TSD shall draw the flight using the color defined for Find Flights unless the flight is an Examined Flight in which case the TSD shall use the Examined Flights color for the icon.

    b. The TSD shall draw the data block with ORG/DEST or ROUTE if either of these options is selected in the Customize Flights dialog box. Otherwise the data block shall be drawn with neither ORG/DEST nor ROUTE information.

5. If a flight is both a "found" flight and a member of a "shown" flight set (defined in Select Flights) and flights are ON (being shown), the TSD shall draw the flight with the following attributes:

    a. The TSD shall draw the flight using the color defined for the flight set in Select Flights unless the flight is an Examined Flight in which case the TSD shall draw the flight with the Examined Flights color for the icon.

    b. The TSD shall draw the data blocks with ORG/DEST or ROUTE if either of these options is selected in the Customize Flights dialog box. However if neither option is selected in the Customize Flights dialog box, then the TSD shall draw the data block with the option as specified in the Select Flights dialog box.

4.0   BROWSE FUNCTION

The Browse function provides the user with the ability to change the display attributes of individual flights. The following attributes can be changed using the Browse function:

> Show/Hide Data Block
> Include Org/Dest, Route, or neither in the data block
> Color of the icon
> Last TZ
> History
> Lead Line
> Delete Flight Icon
> Draw Route
> Location of the Data Block

The TSD shall implement the following rules for controlling these display attributes with the Browse function:

1. The Browse function shall always be able to toggle the display attributes of selected (or preselected) flights regardless of which function is causing the flight to be shown.

2. In the case where multiple flights are selected, the TSD shall toggle the display of the attribute for each selected flight. This means that the attribute may be turned ON for some flights and OFF for others depending upon whether the attribute is ON or OFF when the function in invoked.

3. When the Toggle Data Block option is selected in the pop-up menu and the data block is <u>not</u> being shown, the TSD shall display the data block for the selected flights. When the Toggle Data Block option is selected in the pop-up menu and the data block is being shown, the TSD shall remove the data block for the selected flights.

4. When the Toggle Org/Dest option is selected in the pop-up menu and the Org/Dest is <u>not</u> being shown in the data block, the TSD shall display the Org/Dest values in the data block for the selected flights. When the Toggle Org/Dest option is selected in the pop-up menu and the Org/Dest is being shown in the data block, the TSD shall remove the Org/Dest values in the data block for the selected flights.

5. When the Toggle Route option is selected in the pop-up menu and the Route is <u>not</u> being shown in the data block, the TSD shall display the Route values in the data block for the selected flights. When the Toggle Route option is selected in the pop-up menu and the Route is being shown in the data block, the TSD shall remove the Route values in the data block for the selected flights.

6. When a flight is pre-selected, its data block shall be shown using the highlight color (white or black). If either of the ORG/DEST or ROUTE option has been selected in the Customize Flights dialog box, then the data block shall contain the option selected. If neither option has been selected in the Customize Flights dialog box and the flight is a member of a flight set (as defined in Select Flights) then the data block shall contain the option specified in the flight set definition. Otherwise the data block shall contain neither ORG/DEST nor ROUTE.

7. Changes to a particular flight's display caused by the Browse function shall remain in affect until the flight is redrawn as a result of clicking OK or APPLY in either the Find Flights, Customize Flights, or the Select Flights dialog box.

8. The TSD shall display the flights pop-up menu when a flight is preselected or selected and the right mouse button is clicked. This pop-up menu shall provide the options listed above to change the display attributes of selected flights. (The Browse specification describes these attributes and what they mean.) Except the Data Block Color attribute, when one of these attributes is selected, the TSD shall toggle that attribute ON/OFF for the selected flight(s).

9. The user shall be able to drag the data block for an individual flight to a specific location using the middle mouse button and the pointer. The user shall be able to highlight the data block by positioning the pointer on either the flight icon or the data block if it is toggled ON. When the data block is highlighted or the flight icon is highlighted and middle mouse button is depressed, an outline of the data block shall be drawn. This outline shall be moved to

correspond with the movement of the pointer position. When the middle mouse button is released, the TSD shall redraw the data block at the current position of the data block outline. The data block shall continue to be drawn at the same relative position to the flight icon as the flight's position is changed with each update.

5.0   CUSTOMIZE FLIGHTS FUNCTION

The Customize Flights function allows the user to change the attributes of all flights that are being displayed. This function may be invoked using quick keys to toggle individual attributes or by changing check boxes in the Customize Flights dialog box and clicking OK or APPLY. The intent of this function is that it when an attribute is turned ON, this action shall override all other functions. However whether or not an attribute for an individual flight is turned OFF by Customize Flights may depend upon the attribute setting in other functions. The attributes that can be controlled by Customize Flights are:

> Show/Hide Data Block
> Include Org/Dest, Route, or neither in the data block
> Include Beacon Code in the data block
> Last TZ
> History
> Lead Line
> Draw Route

The TSD shall implement the following rules for controlling these display attributes with the Customize Flights function:

1. When a quick key associated with Customize Flights is pressed, the TSD shall toggle the state of the associated attribute in the Customize Flights dialog box and the TSD shall execute the change for only the attribute that is associate with the quick key. (Note that this is different than changing the item in the Customize Flights dialog box and pressing the OK or APPLY button since that action will apply all of the attributes specified in the Customize Flights dialog box. For instance, if a data block is toggled ON with the browse function and the Show Route quick key is pressed, the route shall be shown for all flights whose data block is being shown and the data block shall remain to be shown even if the Data Block option in Customize Flights is OFF.)

2. In the rules that follow, when it is stated that an attribute is turned ON or OFF in the Customize Flights dialog box, this means that the appropriate check box or radio button is selected (or deselected) and that OK or APPLY has been clicked. The OK or APPLY buttons must be clicked to turn an attribute ON or OFF.

3. In the Customize Flights function if an attribute is turned ON, the TSD shall draw that attribute for all flights shown on the display. The same rule applies when a quick key turns ON the attribute. The intent of this rule is that when the user presses a quick key to turn ON an attribute, they expect that the attribute should be turned ON for all flights shown on the display.

4. In the Customize Flights function if an attribute is turned OFF, the TSD shall remove the attribute for all flights unless some other function has specified that the attribute is to be

drawn for certain flights.

5. In the Customize Flights function, when the Draw Route attribute is turned ON, the TSD shall draw the route of all flights. When the Draw Route attribute is turned OFF, the TSD shall remove the drawn route of all flights except those that are contained in a flight set (defined in Select Flights) that has the draw route attribute turned ON. (In releases prior to 7.5, the routes were not drawn unless the data block was drawn.)

6. In the Customize Flights dialog box if ORG/DEST or ROUTE is selected when OK or APPLY is clicked, the TSD shall include the appropriate item in all data blocks. This includes all data blocks that are currently being drawn and those that are drawn thereafter including the data blocks drawn using the browse function.

7. If neither ORG/DEST nor ROUTE is selected when OK or APPLY is clicked, the TSD shall remove the appropriate item from all data blocks except for those data blocks being drawn for flights that are members of a "shown" flight set (as defined in Select Flights). In the latter case, the Select Flights specification shall determine the contents of the data blocks. This means that when ORG/DEST or ROUTE is ON in the Customize Flights dialog box, that state overrides whatever is specified in Select Flights.

6.0   EXAMINED FLIGHTS

The Examined Flights function is used to identify those flights that contribute to a particular monitor alert condition that is of interest to the user. Hence the user shall be able to readily identify these flights by using a distinct icon color that is defined in the Change Colors and Fonts function. The attributes that are controlled by Examined Flights are:

> Type of icon
> Color of the icon

The TSD shall implement the following rules for controlling this display attribute with the Examined Flights function:

1. Icon Color: When a flight is displayed as an Examined Flight, the TSD shall display the flight using the Examined Flights color for the icon that is specified in the Change Colors and Fonts function. The Examined Flights function overrides the color attribute specified by all other functions.

2. Icon Type: The TSD shall display active flights using the automatic icon. The TSD shall display inactive flights using the circle icon that is drawn at the originating airport. The TSD shall display flights that have landed using a small circle icon that is drawn at the arrival airport.

3. Data block: If a flight is both an Examined Flight and a "found" flight, the TSD shall display the data block for the flight.

4. If a flight is both an Examined Flight and a member of a "shown" flight set and flights are ON (being shown), the TSD shall draw the flight with the attributes defined in Select Flights except for the color, icon, and data block attributes discussed above. However any attributes

that are turned ON in Customize Flights shall override the same attribute in Select Flights.

5. If an Examined Flight is not a member of a "shown" flight set or if flights are OFF (not being shown), the TSD shall draw the flight using the attributes specified by the Customize Flights function.

7.0   FCA FLIGHTS

The FCA Flights function is used to identify those flights that are predicted to intersect an FEA/FCA. The user shall be able to readily identify these flights by using a distinct icon color that is defined for the FEA/FCA. The attributes that are controlled by FCA Flights are:

> Type of icon
> Color of the icon

The TSD shall implement the following rules for controlling this display attribute with the FCA Flights function:

1. Icon Color: When a flight is displayed as an FEA/FCA Flight, the TSD shall display the flight icon using the FEA/FCA color unless the flight is also an Examined Flight in which case the Examined Flight color shall be used.

2. Icon Type: The TSD shall draw the flight using the automatic icon.

3. If a flight is both an FEA/FCA Flight and a member of a "shown" flight set and flights are ON (being shown), the TSD shall draw the flight with the attributes defined in Select Flights except for the color and icon attributes discussed above. However any attributes that are turned ON in Customize Flights shall override the same attribute in Select Flights.

4. If an FEA/FCA Flight is not a member of a "shown" flight set or if flights are OFF (not being shown), the TSD shall draw the flight using the attributes specified by the Customize Flights function.

8.0   GENERAL RULES

Unless specifically stated otherwise, the following general rules shall be applied:

1. The Browse function may temporarily change the display of a selected flight. However when another function that controls the display of the flight is invoked, that function shall override the effect of the Browse function.

2. The Customize Flights function defines the attributes of the display of all flights when the display attribute is turned on but only when it is turned on.

3. Examined Flights overrides the color attribute defined by all other functions.

4. Find Flight turns on data blocks. However the data blocks may be turned off for individual flights using the Browse function.

5. Deleted flight icons shall be restored when the flight display is toggled OFF and then ON (F quick key).

6. Examined Flights, FEA/FCA flights, and Find Flights shall be displayed using the automatic icon.

7. In general, the display of flights using the FCA Flights function, Monitor Alert Flights function, Find Flights function, or the display of flights using the Select Flights function shall be independent of each other except that the color and type of flight icon shall be determined by the following priority order:

> Monitor Alert Examined Flights
> FEA/FCA Flights
> Select Flights
> Find Flights